CLAIMS

WE CLAIM:

1. A rotor for use in a high speed generator, the rotor comprising:

a shaft extending axially through the rotor;

a plurality of spokes extending radially from a location along the shaft;

a plurality of supports, wherein each one of the supports is positioned proximate a respective one of the spokes;

a plurality of coils of wire windings, each wrapped around a respective one of the supports and a respective one of the spokes; and

at least one cap device coupled to ends of the spokes away from the shaft, the at least one cap device preventing the wire windings of the coils from moving outward away from the shaft beyond outer radial limits;

wherein each support is coupled to the at least one cap device, wherein each support extends radially inward along its respective spoke from the at least one cap device to at least a respective inner limit,

wherein each support includes at its respective inner limit a respective flange protruding away from the respective spoke, and wherein each flange prevents the wire windings of the respective coil from moving beyond the respective inner limit towards the shaft.

2. The rotor of claim 1, wherein the supports are U-shaped brackets that curve around the respective spokes.

3. The rotor of claim 2, wherein the supports are drawn towards the at least one cap device when the supports are coupled thereto, so that the wire windings of the respective coils experience pressure between the respective flanges and at least one outward protrusion of the at least one cap device.

4. The rotor of claim 1, wherein the supports are formed from a material selected from the group consisting of aluminum, titanium and steel.

5. The rotor of claim 1, wherein the at least one cap device includes a plurality of cap hats that are respectively coupled to the respective spokes.

6. The rotor of claim 5, wherein each cap hat is also respectively coupled to the respective support.

7. The rotor of claim 6, wherein each cap hat is coupled to its respective spoke by two bolts, and each cap hat is further coupled to its respective support by two additional bolts.

8. The rotor of clam 1, wherein the at least one cap device is a ring that is coupled to all of the spokes.

9. The rotor of claim 1, wherein the plurality of poles includes four poles.

10. The rotor of claim 1, wherein the rotor is configured for implementation as the rotor of a high-speed, main generator, and wherein the rotor is configured to receive field winding current for the wire coils from an exciter generator.

11. A support for implementation on a spoke extending outward radially from a shaft of a rotor, the support comprising:

a U-shaped main portion having an outer face and an inner face, wherein the support is configured so that the inner face of the support is in physical contact with the spoke when the support is supported thereby, and wherein the support is further configured to support a wire coil that is wrapped around the support along the outer face;

first and second sides of the U-shaped main portion that are substantially transverse with respect to the outer and inner faces and also with respect to a channel along the inner face through the U-shaped main portion, the channel being configured to receive the spoke; and

a flange proximate the first side of the U-shaped main portion and extending outward away from the channel beyond the outer face;

wherein the support is configured to be positioned on the spoke so that the first side is closer to the shaft than the second side; and

wherein the support is configured to allow for coupling of the support to a cap hat.

12. A generator comprising:

a stator;

a rotor rotatably coupled within the stator, the rotor including:

a shaft extending axially through the rotor;

a plurality of appendages extending radially outward from the shaft;

a plurality of wire coils that are supported away from the shaft by the plurality of appendages;

a first means for preventing outward radial movement of wires of the wire coils beyond respective outer limits; and

a second means for preventing inward radial movement of wires of the wire coils beyond respective inner limits;

wherein at least one of the first means and second means is secured to the plurality of appendages and, when only one of the first means and second means is secured to the plurality of appendages, the remaining other means is further secured to that one of the first and second means that is secured to the appendages.

13. The generator of claim 12, wherein the first means includes at least one of a plurality of end cap hats and a ring.

14. The generator of claim 12, wherein the second means includes a plurality of U-shaped supports that are positioned in between the appendages and the wire coils, and wherein the U-shaped supports include flanges that protrude away from the appendages proximate the respective inner limits along the appendages, and thereby prevent movement of the wire coils beyond the inner limits toward the shaft.

15. The generator of claim 12, wherein the second means includes a plurality of L-type brackets, wherein the L-type brackets respectively extend from

the first means inward toward the shaft along the plurality of appendages and further at the respective inner limits extend toward the appendages, so that inward movement of the wire coils beyond the inner limits is prevented.

16. An end cap device for implementation in a rotor including an appendage extending outward radially from a shaft of the rotor and further including a support positioned on the appendage, wherein the support is capable of supporting end turns of a wire coil of the rotor and includes a flange at an inner radial position that limits movement of the end turns radially inward toward the shaft, the end cap device comprising:

a physical barrier;

a first fastening element by which the end cap device is coupled to the appendage; and

a second fastening element by which the end cap device is coupled to the support.

17. In a rotor, a method of retaining wires of a coil within a desired radial region relative to a shaft of the rotor, the method comprising:

positioning at least one of a support and an additional element on a first appendage extending radially from the shaft, wherein the at least one support and additional element includes a flange;

wrapping the wires of the coil onto the support;

providing a cap hat proximate an outer end of the first appendage away from the shaft; and

attaching at least one of the cap hat and the support to the first appendage and, if only one of the cap hat and the support is attached to the first appendage, further attaching the cap hat and the support to one another;

wherein the flange extends away from the first appendage and prevents movement of the wires of the coil toward the shaft beyond an inner limit, and wherein the cap hat prevents movement of the wires away from the shaft beyond an outer limit.

18. The method of claim 17, wherein the cap hat is attached to the appendage, and the cap hat is additionally attached to the support.

19. The method of claim 18, wherein the cap hat is attached to the appendage by two bolts, and the cap hat is additionally attached to the support by two additional bolts.

20. The method of claim 19, wherein the flange is provided on the support, and wherein the flange provides force to move at least some of the wires of the coil toward the cap hat as the support is attached to the cap hat by the two additional bolts.

21. The method of claim 17, wherein the cap hat and the support are both attached to the appendage.

22. The method of claim 17, wherein the additional element is a L-type bracket that includes the flange, wherein the coil includes an inner side and an outer side, wherein the support physically contacts the inner side of the coil, and wherein the L-type bracket is attached to the cap hat so that the bracket extends away from the cap hat toward the shaft on the outer side of the coil.

23. The method of claim 17, further comprising:

positioning a second support on a second appendage extending radially from the shaft opposite the first appendage;

wrapping wires of a second coil onto the second support;

providing a second cap hat proximate a second outer end of the second appendage away from the shaft;

attaching the second cap hat to the second appendage and further attaching the second cap hat and the second support to one another; and

providing a second flange on the second support,

wherein the second flange extends away from the second appendage and prevents movement of the wires of the second coil toward the shaft beyond a second inner limit, and wherein the second cap hat prevents movement of the wires of the second coil away from the shaft beyond a second outer limit.